the second information recording surface so as to conduct the reproducing and/or recording information of the second optical information recording medium; and

a spherical aberration has at least one substantially discontinuous portion when the converging optical system converges the second light flux onto the second information recording surface so as to conduct reproducing and/or recording the information of the second optical information recording medium.

REMARKS

By this Amendment, Applicants have amended the title and claims 1, 22, 23, and 36. No new matter has been added.

In the Office Action dated February 27, 2003, the Examiner required a new title; rejected claims 1-8, 11-13, 16, 20-31, and 34-36 under 35 U.S.C. § 102(e) as being anticipated by Saito et al. (U.S. Patent No. 6,192,021); and indicated that claims 9, 10, 14, 15, 17-19, 32, and 33 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to the Examiner's requirement for a new title, Applicants have amended the title such that it is clearly indicative of the invention to which the claims are directed. Therefore, Applicants respectfully submit that the new title fully complies with 37 C.F.R. § 1.72.

In the Office Action, without making either a formal objection or a formal rejection, the Examiner asserts that "[t]he independent claims recite non-positive limitations such as 'substantially' and alternative limitation 'or'." Office Action at 2. The Examiner thereafter concludes that "only one of the alternative limitation must be shown

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to read on the claimed invention," and that "what is substantially to one skilled in the art is different to another." Id. Without addressing the accuracy of those assertions and conclusions, Applicants have amended independent claims 1, 22, and 36 in a manner that at least partially obviates the assertion and conclusion relating to the alternative term, "or." Furthermore, Applicants respectfully submit that they have provided guidance to one skilled in the art with respect to the meaning of term, "substantially," in the specification, at least on page 86, lines 16-23, which recites, in pertinent part,

> the sentence "a spherical aberration has a substantially discontinuous portion" means that if a spherical aberration is continuous, a change of a spherical aberration comes suddenly, for example, a spherical aberration changes by 5 μm or more in a direction of an optical axis when NA changes by 0.01 so that a position of light ray on the disk is substantially separated at a boundary of a certain NA.

With respect to the rejection of Applicants' independent claims 1, 22, and 36 under 35 U.S.C. § 102(e) as being anticipated by Saito et al., Applicants have amended claims 1, 22, and 36, thereby obviating that rejection. To the extent, however, that the Examiner may consider applying the above-mentioned rejection to claims 1, 22, and 36, as amended, Applicants respectfully submit that such a rejection would be improper since the Saito et al. reference fails to disclose or suggest each and every element of Applicants' amended claims 1, 22, and 36. M.P.E.P. §§ 2131, 2141.

Applicants' invention as recited in amended claim 1 is directed to an optical pickup apparatus to conduct reproducing and/or recording information of a first optical

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information recording medium including a first transparent base plate having a thickness of t1 and a second optical information recording medium including a second transparent base plate having a thickness of t2 (t2>t1). The optical pickup apparatus includes a first light source to emit a first light flux having a wavelength of λ1, a second light source to emit a second light flux having a wavelength of λ2 (λ1 < λ2), and a converging optical system to converge the first light flux or the second light flux onto a first information recording surface of the first optical information recording medium or a second information recording surface of the second optical information recording medium. The converging optical system includes an objective lens. The optical pickup apparatus also includes an optical detector to receive reflected light from the first optical information recording medium or the second optical information recording medium. The converging optical system includes a diffracting section on an almost entire surface in an effective aperture of at least one surface thereof. The converging optical system generates an m-th order diffracted light ray (m being an integer other than zero) more than other order diffracted light rays when the first light flux passes the diffracting section and converges the m-th order diffracted light ray onto the first information recording surface so as to conduct the reproducing and/or recording information of the first optical information recording medium. The converging optical system generates an n-th order diffracted light ray (n being an integer other than zero) more than other order diffracted light rays when the second light flux passes the diffracting section and converges the n-th order diffracted light ray onto the second information recording surface so as to conduct the reproducing and/or recording information of the second optical information recording medium. A spherical aberration has at least one substantially discontinuous portion

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when the converging optical system converges the second light flux onto the second information recording surface so as to conduct reproducing and/or recording the information of the second optical information recording medium.

Applicants respectfully submit that guidance with respect to the meaning of the term, "almost," is provided on page 86, lines 8-12, of the specification, which recites "almost entire surface is an effective aperture means more than 80% of the whole of the effective diameter surface, and more preferably, more than 90%."

The Saito et al. reference does not disclose or suggest at least an optical pickup apparatus including a diffracting section on an almost entire surface in an effective aperture of at least one surface thereof. Rather, the Saito et al. reference discloses an objective lens that is a convex lens which has aspherical refraction surface S1 on the light source side and aspherical refraction surface S2 on the optical disk side. Col. 13, lines 13-18. In short, the objective lens disclosed in the Saito et al. reference is a refractive lens, not a diffractive section. Therefore, the Saito et al. reference fails to disclose or suggest at least that subject matter recited in amended claim 1.

At least by virtue Applicants' diffracting section, the converging optical system generates an m-th order diffracted light ray more than other order diffracted light rays when the first light flux passes the diffracting section and converges the m-th order diffracted light ray onto the first information recording surface so as to conduct the reproducing and/or recording information of the first optical information recording medium. The converging optical system generates an n-th order diffracted light ray (n being an integer other than zero) more than other order diffracted light rays when the second light flux passes the diffracting section and converges the n-th order diffracted

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light ray onto the second information recording surface so as to conduct the reproducing and/or recording information of the second optical information recording medium. Furthermore, when the converging optical system converges the second light flux onto the second information recording surface so as to conduct reproducing and/or recording the information of the second optical information recording medium, a spherical aberration has at least one substantially discontinuous portion, for example, as shown in Applicants' exemplary embodiment depicted in Fig. 3(b).

Furthermore, the Saito et al. reference discloses three split surfaces Sd1, Sd2, and Sd3, (see Figs. 2(a) through 2(c)), in which split surface Sd2 is provided at a middle portion between split surfaces Sd1 and Sd3. As shown in the Saito et al. reference, the area of split surface Sd2 is on the order of only about 10% of the area of the entire surface of the objective lens, unlike Applicants' claimed optical pickup apparatus. Therefore, for at least that reason, the Sato et al. reference fails to disclose or suggest the above-mentioned subject matter recited in Applicants' amended claim 1.

In addition, by virtue of Applicants' diffracting section being provided on almost the entire surface in an effective aperture of at least one surface of the converging optical system, it is possible to conduct recording and/or reproducing information for different optical information recording media having respective protecting substrates of differing thicknesses. In the recording and/or reproducing information for the second optical information recording medium, a spherical aberration has at least one substantially discontinuous portion, for example, as shown in the exemplary embodiment depicted in Applicants' Fig. 3(b). As a result, the above-noted effect of

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Applicants' diffracting section would not have been obvious from the refraction surface composed of three split surfaces Sd1, Sd2, and Sd3 of the Saito et al. reference.

Applicants' invention as recited in amended claim 22 is directed to an objective lens for use in an optical pickup apparatus to conduct reproducing and/or recording information of an optical information recording medium having a transparent base plate. The objective lens includes at least one surface, wherein a diffracting section is provided on an almost entire surface of an effective aperture of the surface. When a light flux having a predetermined wavelength passes the diffracting section, the objective lens generates an m-th order diffracted light ray (m being an integer other than zero) more than other order light rays, and when the m-th order diffracted light ray is converged through a transparent base plate having a predetermined thickness, a spherical aberration has at least one substantially discontinuous portion.

The Saito et al. reference does not disclose or suggest at least an objective lens including an optical pickup apparatus including a diffracting section on an almost entire surface in an effective aperture of at least one surface thereof. For at least that reason, the Saito et al. reference fails to disclose at least that subject matter recited in amended claim 22.

Applicants' invention as recited in amended claim 36 is directed to an optical information reproducing and/or recording apparatus to conduct reproducing and/or recording information of a first optical information recording medium including a first transparent base plate having a thickness of t1 and a second optical information recording medium including a second transparent base plate having a thickness of t2 (t2>t1). The optical information reproducing and/or recording apparatus includes

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an optical pickup apparatus including a first light source to emit a first light flux having a wavelength of λ1, a second light source to emit a second light flux having a wavelength of λ2 (λ1 < λ2), and a converging optical system to converge the first light flux or the second light flux onto a first information recording surface of the first optical information recording medium or a second information recording surface of the second optical information recording medium. The converging optical system includes an objective lens. The optical information reproducing and/or recording apparatus also includes an optical detector to receive reflected light from the first optical information recording medium or the second optical information recording medium. The converging optical system includes a diffracting section on an almost entire surface in an effective aperture of at least one surface thereof. The converging optical system generates an m-th order diffracted light ray (m being an integer other than zero) more than other order diffracted light rays when the first light flux passes the diffracting section and converges the m-th diffracted light ray onto the first information recording surface so as to conduct the reproducing and/or recording information of the first optical information recording medium. The converging optical system also generates an n-th order diffracted light ray (n being an integer other than zero) more than other order diffracted light rays when the second light flux passes the diffracting section and converges the n-th diffracted light ray onto the second information recording surface so as to conduct the reproducing and/or recording information of the second optical information recording medium. A spherical aberration has at least one substantially discontinuous portion when the converging optical system converges the second light flux onto the second information

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recording surface so as to conduct reproducing and/or recording the information of the second optical information recording medium.

Unlike Applicants' amended claim 36, the Saito et al. reference fails to disclose or suggest at least an optical information reproducing and/or recording apparatus including an optical pickup apparatus including a diffracting section on an almost entire surface in an effective aperture of at least one surface thereof. For at least that reason, the Saito et al. reference fails to disclose or suggest at least that subject matter recited in amended claim 36.

Accordingly, Applicants respectfully submit that amended independent claims 1, 22, and 36 are allowable. Furthermore, Applicants submit that claims 2-21 and 23-35 are allowable by virtue of their dependency on claims 1 and 22, respectively, as well by their additional recitations of novel and non-obvious subject matter. Therefore, claims 1-36 should be allowable.

Applicants respectfully request the reconsideration and reexamination of this application and the timely allowance of the pending claims.

If the Examiner believes that a telephone conversation might advance prosecution, the Examiner is cordially invited to call Applicants' representative at 571-203-2739.

Applicants respectfully submit that the Office Action contains numerous assertions relating to the related art and the claims. Regardless of whether those assertions are addressed specifically herein, Applicants decline to automatically subscribe to them.

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Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P.

Dated: July 28, 2003

By: David W. Hill
David W. Hill
Reg. No. 28,220

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Washington, DC 20005
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APPENDIX TO THE AMENDMENT

IN THE TITLE:

Please change the title to read -- OPTICAL PICK-UP APPARATUS, OPTICAL [ELEMENTS]ELEMENT, AND OBJECTIVE LENS HAVING DIFFRACTING SECTION --

IN THE CLAIMS:

Please amend claims 1, 22, 23, and 36, as follows:

1. (Amended) An optical pickup apparatus to conduct reproducing and/or recording information of a first optical information recording medium including a first transparent base plate having a thickness of t1 and a second optical information recording medium including a second transparent base plate having a thickness of t2 (t2>t1), comprising:

a first light source to emit a first light flux having a wavelength of λ1;

a second light source to emit a second light flux having a wavelength of λ2 (λ1 < λ2);

a converging optical system to converge the first light flux or the second light flux onto a first information recording surface of the first optical information recording medium or a second information recording surface of the second optical information recording medium, the converging optical system having an objective lens; and

an optical detector to receive reflected light from the first optical information recording medium or the second optical information recording medium;

wherein the converging optical system comprises a diffracting section on [an entire surface in an effective aperture or] an almost entire surface in [the] an effective aperture of at least one surface thereof,

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the converging optical system generates [a] an m-th order diffracted light ray (m being an integer other than zero) more than other order diffracted light rays when the first light flux passes the diffracting section and converges the m-th order diffracted light ray onto the first information recording surface so as to conduct the reproducing and/or recording information of the first optical information recording medium;

the converging optical system generates [a] an n-th order diffracted light ray (n being an integer other than zero) more than other order diffracted light rays when the second light flux passes the diffracting section and converges the n-th order diffracted light ray onto the second information recording surface so as to conduct the reproducing and/or recording information of the second optical information recording medium; and

a spherical aberration has [at least one discontinuous portion or] at least one substantially discontinuous portion when the converging optical system converges the second light flux onto the second information recording surface so as to conduct reproducing and/or recording the information of the second optical information recording medium.

22. (Amended) An objective lens for use in an optical pickup apparatus to conduct reproducing and/or recording information of an optical information recording medium having a transparent base plate, comprising:

at least one surface;

wherein a diffracting section is provided on [an entire surface of an effective aperture of the surface or] an almost entire surface of [the] an effective aperture of the surface, wherein when a light flux having a predetermined wavelength passes the diffracting

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section, the objective lens generate [a] an m-th order diffracted light ray (m being an integer other than zero) more than other order light rays and when the m-th order diffracted light ray is converged through a transparent base plate having a predetermined thickness, a spherical aberration has [at least one discontinuous portion or] at least one substantially discontinuous portion.

23. (Amended) The objective lens of claim [21] 22, herein the optical pickup apparatus conducts reproducing and/or recording information of a first optical information recording medium including a first transparent base plate having a thickness of t1 and a second optical information recording medium including a second transparent base plate having a thickness of t2 (t2>t1),

when a first light flux having a wavelength of λ1 passes the diffracting section, the objective lens generates the m-th order diffracted light ray (m being an integer other than zero) more than other order diffracted light rays and converges the m-th order diffracted light rays onto a first information recording surface so that the optical pickup apparatus conducts the reproducing and/or recording information of the first optical information recording medium;

when a second light flux having a wavelength of λ2 (λ1 < λ2) passes the diffracting section, the objective lens generates [the] an n-th order diffracted light ray (n being an integer other than zero) more than other order diffracted light rays and converges the n-th order diffracted light rays onto a second information recording surface so that the optical pickup apparatus conducts the reproducing and/or recording information of the second optical information recording medium; and

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when the objective lens converges the second light flux onto the second information recording surface, a spherical aberration has at least one discontinuous portion or at least one substantially discontinuous portion.

36. (Amended) An optical information reproducing and/or recording apparatus to conduct reproducing and/or recording information of a first optical information recording medium including a first transparent base plate having a thickness of t1 and a second optical information recording medium including a second transparent base plate having a thickness of t2 (t2>t1), comprising:

an optical pickup apparatus comprising:

a first light source to emit a first light flux having a wavelength of λ1;

a second light source to emit a second light flux having a wavelength of λ2 (λ1 < λ2);

a converging optical system to converge the first light flux or the second light flux onto a first information recording surface of the first optical information recording medium or a second information recording surface of the second optical information recording medium, the converging optical system having an objective lens; and

an optical detector to receive reflected light from the first optical information recording medium or the second optical information recording medium;

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wherein the converging optical system comprises a diffracting section on [an entire surface in an effective aperture or] an almost entire surface in [the] an effective aperture of at least one surface thereof,

the converging optical system generates [a] an m-th order diffracted light ray (m being an integer other than zero) more than other order diffracted light rays when the first light flux passes the diffracting section and converges the m-th diffracted light ray onto the first information recording surface so as to conduct the reproducing and/or recording information of the first optical information recording medium;

the converging optical system generates [a] an n-th order diffracted light ray (n being an integer other than zero) more than other order diffracted light rays when the second light flux passes the diffracting section and converges the n-th diffracted light ray onto the second information recording surface so as to conduct the reproducing and/or recording information of the second optical information recording medium; and

a spherical aberration has [at least one discontinuous portion or] at least one substantially discontinuous portion when the converging optical system converges the second light flux onto the second information recording surface so as to conduct reproducing and/or recording the information of the second optical information recording medium.

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